

MONOLITHIC INFRARED FOCAL PLANE ARRAY DETECTORS

ABSTRACT

5 An infrared sensing device including a multi-layer II-VI semiconductor material grown
by molecular beam epitaxy on a readout circuit fabricated on silicon substrate having a
orientation one degree tilted from the (100) direction is provided in this invention. A method to
grow single crystalline mercury cadmium telluride multi-layer structure on custom-designed
readout circuit (ROIC) is provided. Due to the height difference of more than 15 micron between
10 the two planes containing the detector output gates and the ROIC signal input gates, a mesa with
at least one sloped side is fabricated and the interconnecting metal electrodes running on them to
connect the detector output to ROIC input. Planar photovoltaic junctions are fabricated
selectively on the II-VI mesa structure formed on ROIC. At least one infrared detecting cell
being formed in the mesa, with a conductor interconnect layer connecting the detection cell to
15 the readout integrated circuit. Another design to simultaneously produce two linear arrays of
monolithic infrared detectors is provided by the suitable design of the ROIC input pads and the
infrared detector arrays.